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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/816,770	03/26/2001	Tsuyoshi Kitahara	Q63724	4825

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EXAMINER

NGUYEN, LAM S

ART UNIT PAPER NUMBER

2853

DATE MAILED: 07/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/816,770

Applicant(s)

KITAHARA, TSUYOSHI

Examiner

LAM S NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07-05-2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-10, 13-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitahara et al. (EP0827838) in view of Barbehenn et al. (U.S. 5363134).

Kitahara et al. discloses a method of jetting liquid droplets or a liquid jetting apparatus, comprising:

providing a liquid head (FIG. 1, element 10), including:

a plurality of nozzle orifices (FIG. 3, element 22A, and column 6, line 19-22)

a plurality of pressure generation chambers associated with the nozzle orifices (FIG. 3, element 27, and column 7, line 38-39)

a plurality of piezoelectric vibrators (FIG. 3, element 17)

a correction data (in term of "the print data comprises four bits") (column 6, line 51-53 and column 7, line 1-10) storage (in term of "RAM") (column 5, line 29-32) for storing correction data that controls the amount of liquid jetted from the identified nozzle orifices by selecting a proper drive signal in a single jetting cycle. Therefore, based on this correction data,

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the displacement behavior of a piezoelectric vibrator associated with the identified nozzle orifices is adjusted

a drive signal generator (FIG.1, element 8) provides N drive signals (in term of “four pulses”) for driving the piezoelectric vibrators in a single jetting cycle (in term of “print period”) (FIG. 4). The drive signals respectively having different liquid jetting energy from each other (FIG. 4, the first and second pulses have different amplitude and width)

a drive signal supplier (FIG. 1, element 16) for selecting and applying M signals (one or at least two) from the N drive signals to the piezoelectric vibrators within the single jetting cycle (FIG. 9, column 14, line 43-52), where the period of the single jetting cycle (in term of “print period”) is long enough to substantially damp residual vibration of a meniscus of the liquid in the nozzle orifice due to jetting by the last drive signal (column 15, line 18-20, and line 28-30)

the selected drive signals are applied at different intervals within the single jetting cycle (FIG. 9)

the intervals are determined such that a phase of residual vibration of a meniscus of the liquid in the nozzle orifice is adjusted due to jetting by a preceding drive signal (FIG. 4-7, and column 10, line 20-35).

the identified nozzle orifice ejects the liquid in accordance with the displacement behavior of the piezoelectric vibrator when the identified nozzle orifice receives print data (Abstract).

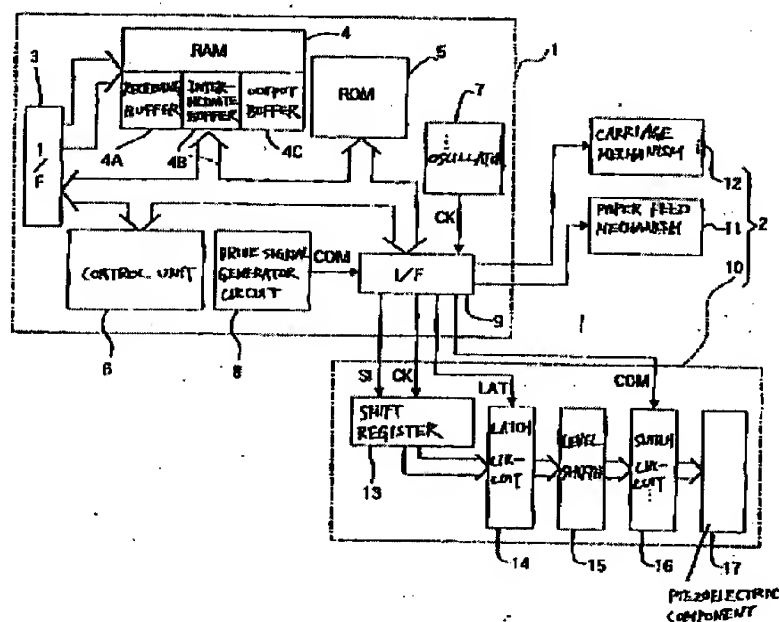
Kitahara does not disclose the providing ID data provides the ID data for identifying the respective nozzle orifices.

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However, Barbehenn et al. discloses a ID data storage provides the ID data for identifying the respective nozzle orifices (column 3, line 43-53).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to include the ID storage (column 3, line 43-53) for providing the ID data of the respective nozzle orifices into the design of Kitahara because this increases the control of proper ink volume, ink drop velocity, missing nozzles, and various other manufacturing tolerances or defects for driving an array of nozzle orifices (column 2, line 2-8).

Fig. 1

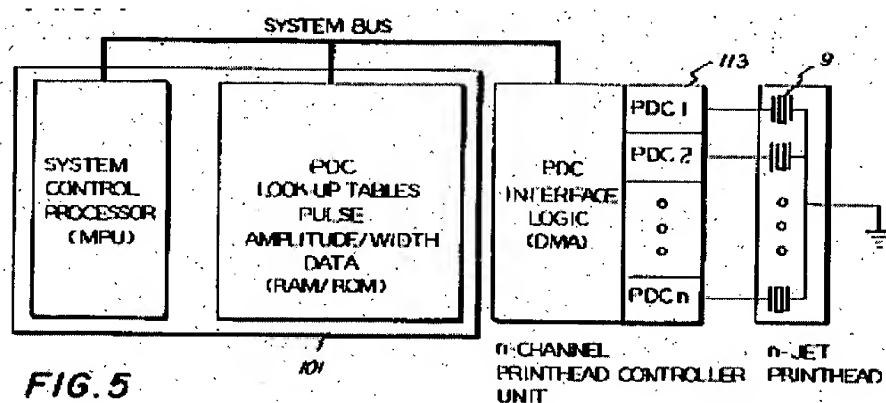


2. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitahara et al. (EP0827838) in view of Barbehenn et al. (U.S. 5363134) as regarded to claim 8, and further in view of Bain (U.S. 4521786).

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Kitahara et al. and Barbehenn et al. disclose the claimed invention as discussed above, except a plurality of drive signal generators provide the different drive signals.

However, Bain discloses a system including a plurality of drive signal generators (in term of “programmable driver/control (PDC)”) (FIG. 4 and FIG. 5, element 113) provide the different drive signals.



Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to substitute a plurality of drive signal generator for providing different drive signals into the design of Kitahara et al. in view of Barbehenn et al. The motivation would be that the parameters such as velocity and volume of a droplet are controlled by programming software at each drive signal generator for each different nozzle orifice as taught by Bain to obtain optimal operation of the printhead (column 1, line 46-61).

### *Allowable Subject Matter*

3. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The closest references Kitahara et al. (EP0827838) and Barbehenn et al. (U.S. 5363134) fail to disclose wherein volume differences among the liquid droplets ejected by the respective drive signals can be divided by a volume of a liquid droplet which is the minimum volume jetted by one single drive signal. Therefore, the limitation of the claimed invention is not disclosed in the prior art.

### ***Response to Arguments***

Applicant's arguments filed 05-21-2002 have been fully considered but they are not persuasive.

4. Regarding to the argument on Claim Rejection Under 35 U.S.C 103 on pages 3-6:

#### **Regarding to argument referring to claim 1:**

On page 4, paragraph 2 of the applicants' argument, the applicants argued that the Kitahara reference does not suggest correction data that corrects the amount of liquid jetted from a nozzle. However, Kitahara discloses a print data based on gray scale level (FIG. 4, element DECODE VALUE) used for selecting one of plurality signals (FIG.4, 1<sup>st</sup>, 2<sup>nd</sup>, or 3<sup>rd</sup> pulse) to change the volume of the liquid amount jetted from a nozzle (FIG. 4). Therefore, based on the claim language and the definition in the specification of the correction data (SPECIFICATION, page 8, line 5-10), the correction data as claimed by the applicants and the print data disclosed by Kitahara are used for the same purpose. Thus, both these data are considered as the same kind of data.

On page 4, paragraph 4, and page 5, paragraph 1 of the applicants' argument, the applicants argued that Barbehenn fails to disclose, teach, or suggest correction data that corrects the amount of liquid jetted from a nozzle so one would not have been motivated to combine

Barbehem and Kitahara. However, the reason for combining the Barbehem reference into the Kitahara invention was the compensation of the limitation teaching the providing ID data for identifying the respective nozzle orifices. Based on the claim language and the definition in the specification (page 8, line 4-5), the ID data in the claimed invention is the same as the ID data disclosed by Barbehem (column 3, line 43-53). In addition, as discussed above, Kitahara discloses the correction data. Therefore, the combination of Kitahara and Barbehem references meets all the limitations in the claimed invention.

**Regarding to argument referring to claims 3, 6, 8:**

On page 5 of the applicants' argument, the applicants argued that claims 3, 6, 8 are allowed since their dependence on the allowable claim 1 as suggested by the applicants. However, as discussed above, claim 1 is rejected, claims 3, 6, and 8, are not allowed.

**Regarding to argument referring to claim 11:**

On page 6, paragraph 1 of the applicants' argument, the applicants argued that Bain fails to compensate for the foregoing deficiencies. However, as discussed above, there is no foregoing deficiency. Therefore, Bain does not need to compensate for any foregoing deficiency.

It appears from the applicant's arguments that he is relying on the term correction data to convey the meaning of compensating the variations of ink drops (expressed in page 5, third paragraph). However, this is not what is claimed. (Notice: During patent examination, the pending claims must be given the broadest reasonable interpretation. See MPEP 2111).

***Conclusion***



**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Koike et al. (US 6024438) teaches a circuit including a memory for storing driving conditions for each head line and a selector for identifying a nozzle orifice.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (703)305-3342. The examiner can normally be reached on 7:00AM - 3:30PM.

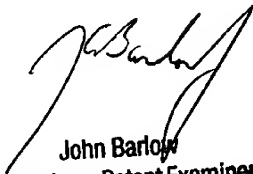
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E BARLOW can be reached on (703)308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-3431 for regular communications and (703)305-3432 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

LN

July 29, 2002

  
John Barlow  
Supervisory Patent Examiner  
Technology Center 2800